

REMARKS

The drawings have been objected to in paragraph 2 of the Office Action on the ground that the single figure of the drawing should be labeled as "Figure 1". It is Applicants' belief, however, that such designation of the single drawing figure would not be appropriate, under 37 C.F.R. §1.84(u)(1) which states that where only a single view is used in an application to illustrate the claimed invention, it must not be numbered and the abbreviation "FIG." must not appear. Accordingly, reconsideration and withdrawal of this ground objection are respectfully requested.

The drawings have been further objected to, as set forth in paragraph 1 of the Office Action based on the proposition that the first and third occupant detection devices are not shown in the drawings. In response to this ground of objection, Applicants have submitted herewith a corrected drawing sheet, showing separately the first electrode 10, and the first occupant detection device 11, and also showing separately the second electrode 15 and the third occupant detection device 16. Accordingly, Applicants respectfully submit that all features recited in the claims are incorporated into the drawing figure.

In response to the objection to the claims as set forth in paragraph 3 of the Office Action, Applicants have amended Claims 7-10, to change the phrase, "occupant detection system" to "method", as suggested. In addition, they have

further carefully reviewed all of the claims present in the application, and have not found any further typographic errors. Applicants have, however, corrected the phrase "electrical coupler variable" in Claim 1 to "electrical coupling variable", for consistency with Claim 2, and with the terminology used in the specification. If, after further evaluation, the Examiner continues to believe that typographic errors exist, further explanation would be appreciated.

Claims 1-4 and 6-9 have been rejected under 35 U.S.C. §102(b) as anticipated by Kuboki et al, while Claims 5 and 10 have been rejected under 35 U.S.C. §103(a) as unpatentable over Kuboki et al. However, for the reasons set forth hereinafter, Applicants respectfully submit that all claims of record in this application, including new Claims 11-14 added by the foregoing amendment, distinguish over the Kuboki et al reference, whether considered by itself or in combination with other references of record.

The present invention is directed to an occupant detection system which includes first and second occupant detection devices. The first occupant detection device is arranged in the vehicle seat, while the second occupant detection device comprises a first electrode which is also arranged in the vehicle seat, and a second electrode which is arranged in a foot well associated with the vehicle seat. An "electrical coupling variable" associated with the two electrodes is determined, based on an electric field applied between the first and second electrodes. As explained at paragraphs [0010] through [0012] of the

specification, an occupant, or a part of an occupant, which is present in the electrical field between the first and second electrode interacts with such electrical fields. Thus, as noted in paragraph [0012], the "electrical capacitance of the electrodes is changed by the introduction of a dielectric between the two electrodes". That is, the capacitance depends in particular on the shape, size and physical arrangement of the dielectric (that is, the occupant) between the electrodes. As indicated in paragraph [0017], it is possible in this manner to determine the leg length, body size or age class of the occupant, and to deduce the length of the occupant's legs.

Finally, Claim 1 further recites that the electrical coupling variable determined based on the electrical field, as noted previously, is used together with a variable determined by the first occupant detection device, to determine whether the vehicle occupant is a child, whose legs do not extend to the vehicle floor, or whether the vehicle occupant is a person whose legs extend to the vehicle floor in the foot well. The advantage of this arrangement is that a conclusion about the occupant can be made by means of a combination of the first and second occupant detection devices, which conclusion relates not only to one area (for example, the seat surface), but also links the two areas (that is, the seat surface and the foot well).

The Kuboki et al reference, on the other hand, discloses a seating sensor which uses pressure sensor elements to calculate the physical condition, such as

height and weight, of an occupant of a vehicle seat. (See Abstract.) For this purpose, as shown in Figure 1, seating sensors 4 and 5 are provided, each being in the form of an array of pressure sensing elements 14. (See, for example, Column 6, lines 17-23; Column 7, lines 1-3 and 13; and Column 7, line 51 through Column 8, line 11.) A controller 6 comprises a mathematically controllable microcomputer which measures data of the pressure values and the pressed positions sensed by the seating sensors 4, 5 in a predetermined time period in order to calculate the occupant's height and weight. (See Column 6, lines 31-35.)

The fourth embodiment, illustrated in Figure 7 of Kuboki et al, and referred to in paragraph 5 of the Office Action utilizes the same basic sensing techniques as described previously with regard to Figure 1. That is, in this embodiment, both a hip sensor 32 and a foot sensor 34 are located in the seat cushion and floor, respectively, and subject determination means 35 recognizes the subject T, based on the pressure detected by the hip sensor 32 and the pressure detected by the foot sensor 34. For this purpose, once again, a pressure sensitive ray is used.

As is apparent from the foregoing brief description, the respective pressure sensors 32 and 34 in Figure 7 of Kuboki et al are quite different from the first and second electrodes as recited in Claims 1, 6 and 11 of the present application. In particular, Claim 1 (for example), recites that a first "electrode" is arranged in

the vehicle seat and a second "electrode" is situated in the foot well. In addition, it also provides that an "electrical coupling variable associated with the two electrodes is determined by means of an electrical field applied between the electrodes". Thus, an interaction between the two electrodes in Claim 1 is used as the electrical coupling variable by which the presence of a person is detected.

In Kuboki et al, on the other hand, no such "electrodes" are provided. Nor is there any discussion of applying an electrical field between the respective seating sensors 4 and 5 (or 32 and 34 in Figure 7), or of detecting an electrical coupling variable between the two sensors. In fact, because the latter sensors in Kuboki et al are pressure sensors, each of which provides its own signal indicative of pressure applied thereto, there would be no utility in applying an electric field between them, and no occasion for detecting an electrical coupling variable between them. Rather, each sensor simply operates individually, and independently of the other to provide a pressure signal to the subject determination means 35.

Moreover, as recited in the final paragraph of Claim 1, the electrical coupling variable determined, based on the electric field between the respective electrodes, is used together with a variable which is determined by the first occupant detection device to detect the presence and size of a seat occupant. Such an arrangement is also neither taught nor suggested in Kuboki et al, in which, as noted, each of the pressure sensors 32 and 34 provides its own signal,

Serial No. 10/633,600

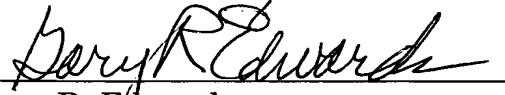
Amendment Dated: February 1, 2005
Reply to Office Action of October 1, 2004

with those two pressure signals being used to detect the size of a subject, based on the tables set forth in Columns 11 and 12 of Kuboki et al. Claims 6 and 11 are similarly limited, and therefore distinguish over Kuboki et al for the same reasons referred to with regard to Claim 1.

In light of the foregoing remarks, this application should be in condition for allowance, and early passage of this case to issue is respectfully requested. If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #095309.52645US).

Respectfully submitted,



Gary R. Edwards
Registration No. 31,824

CROWELL & MORING LLP
Intellectual Property Group
P.O. Box 14300
Washington, DC 20044-4300
Telephone No.: (202) 624-2500
Facsimile No.: (202) 628-8844
GRE:kms:pct
Attachment – replacement sheet of sole figure
354566v1

Serial No. 10/633,600

Amendment Dated: February 1, 2005
Reply to Office Action of October 1, 2004

Amendments to the Drawings:

The attached sheet of drawings includes changes to the figure showing separately the first electrode 10, and the first occupant detection device 11, and also showing separately the second electrode 15 and the third occupant detection device 16.

Attachment: Replacement Sheet